

- 707
917
17. A spinal rod coupler assembly comprising:
—
a coupler member having first, second and third openings, the first opening dimensioned to slidably receive a spinal rod and the second opening dimensioned to receive a locking fastener to retain the spinal rod within the coupler member; and
a fastener receiving member having an opening to receive a bone fastener, the fastener receiving member rotatably and slidably mounted with respect to the coupler member to adjust the position of the fastener, the fastener receiving member being mountable in the third opening of the coupler member.
18. The coupler assembly of claim 17, wherein a longitudinal axis extending through the first opening is transverse to a longitudinal axis extending through the second opening.
19. The coupler assembly of claim 17, wherein a longitudinal axis extending through the third opening is transverse to the longitudinal axis of the first opening.
20. The coupler assembly of claim 17, wherein the longitudinal axis of the third opening is transverse to the longitudinal axis of the second opening.
21. The coupler assembly of 17, wherein the periphery of the second and third openings are spaced apart.
22. The coupler assembly of 17, wherein the opening in the fastener receiving member is circular in configuration.
23. The coupler assembly of 17, wherein the bone fastener is a bolt.
24. The coupler assembly of 17, wherein the bone fastener is a screw.
25. The coupler assembly of 17, wherein a portion of the second opening of the coupler member is internally threaded.
26. The coupler assembly of 25, further comprising an insert member mountable within the second opening, the insert member having a first recess which conforms to the shape of the spinal rod.

PAPERS REFERRED TO IN THIS DOCUMENT

27. The coupler assembly of 26, wherein the fastener receiving member has an elongated shank portion extending into the third opening of the coupler member and the insert has a second recess which conforms to the shape of the shank portion.

28. The coupler assembly of 17, wherein the locking fastener is a set screw engagable with an internal thread formed adjacent the second opening of the coupler member.

29. The coupler assembly of 17, wherein the fastener receiving member has an elongated shank portion extending into the third opening of the coupler member.

30. The coupler assembly of 29, wherein at least a portion of the shank portion has a knurled surface.

31. The coupler assembly of 29, wherein the shank portion is substantially cylindrical in configuration.

32. The coupler assembly of 31, wherein the shank portion has an end portion with a recess formed therein.

33. The coupler assembly of 17, wherein a portion of the coupler opposite the second opening is closed.

34. The coupler assembly of 33, further comprising an insert interposed between the spinal rod and the fastener receiving member.

35. The coupler assembly of 34, further comprising a nut engagable with a threaded portion of the bone fastener. —

36. A spinal rod coupler comprising:
a first opening dimensioned to slidably receive a spinal rod and having a
first longitudinal axis extending therethrough;
a second opening dimensioned to receive a locking fastener and having a
second longitudinal axis extending therethrough transverse to the first longitudinal axis; and

*58
947*

a third opening dimensioned to slidably receive an elongated connector to mount a bone fastener, the third opening having a third longitudinal axis extending therethrough transverse to the first longitudinal axis and the second longitudinal axis.

37. The spinal rod coupler of claim 36, wherein at least portion of the second opening is threaded.

38. The spinal rod coupler of claim 36, wherein the periphery of the first and third openings are longitudinally spaced.

39. The spinal rod coupler of claim 37, wherein the coupler is substantially cylindrical in configuration.

40. A spinal rod coupler assembly comprising:
a coupler having a first opening to receive a spinal rod;
a connecting member extending from the coupler; and
a bone fastener positioned within the connecting member, wherein
movement of the connecting member with respect to the coupler adjusts the position of the
bone fastener.

41. The spinal rod coupler assembly of claim 40, wherein the connecting member is slidably movable within a first bore formed in the coupler.

42. The spinal rod coupler assembly of claim 41, wherein the connecting member is rotatably mounted within the first bore.

43. The spinal rod coupler assembly of claims 40, wherein the coupler is slidably mounted with respect to the spinal rod.

44. The spinal rod coupler assembly of claim 40, wherein the coupler is rotatably mounted with respect to the spinal rod.

45. The spinal rod coupler assembly of claim 40, wherein the bone fastener is received in a circular opening in the connecting member.

115
→ 46. The spinal rod coupler assembly of claim 40, further comprising an insert mounted within the coupler and interposed between the spinal rod and the connecting member.

47. A spinal rod coupler assembly providing four degrees of freedom for connecting a spinal rod to a vertebrae of a patient, comprising:

a) a coupler member having a longitudinal bore surrounded by a wall, the bore having a central axis and first and second end portions, the first end portion being open ended and internally threaded, the second end portion being closed;

b) a plurality of openings in the coupler member, each of the openings communicating with the bore;

c) the plurality of openings including a first through opening aligning along a first line that intersects the central axis of the bore at generally right angles, and a second through opening aligning along a second line that intersects the central axis of the bore at generally right angles.

d) the first opening being sized and shaped to receive a spinal rod having a longitudinal axis, the rod's longitudinal axis aligning with the first line of the first opening of the coupler body;

e) an eyebolt member having a shank portion with a central axis and an eye portion, the shank portion being insertable through the second opening of the coupler body, aligning the central axis of the shank with the second line of the second opening, the eye portion having an opening sized and shaped to mate with a selected bone fastener;

f) whereby the coupler assembly provides for movement along four degrees of freedom which include a movement along and a rotation about the longitudinal axis of the spinal rod, and a movement along a rotation about the central axis of the eyebolt shank when the assembly is being implanted in a patient.